CLIMATE CHANGE
ADVISORY COMMITTEE
REGULAR MEETING
WEDNESDAY, FEBRUARY 16, 2022
5:30 – 7:30 PM
ZOOM MEETING

**CITY OF
BAINBRIDGE ISLAND**

THE CLIMATE CHANGE ADVISORY COMMITTEE WILL HOLD THIS MEETING
USING A VIRTUAL, ZOOM WEBINAR, PER GOVERNOR INSLEE'S
"STAY HOME, STAY HEALTHY" ORDERS

MEMBERS OF THE PUBLIC WILL BE ABLE TO CALL IN TO THE ZOOM MEETING

PLEASE CLICK THE LINK BELOW TO JOIN THE WEBINAR:
HTTPS://BAINBRIDGEWA.ZOOM.US/J/91390380790
OR TELEPHONE: 1 253 215 8782
WEBINAR ID: 913 9038 0790

AGENDA

5:30  CALL MEETING TO ORDER/ROLL CALL/ACCEPT OF MODIFY AGENDA/CONFLICT OF INTEREST DISCLOSURE

5:35  APPROVE JANUARY 19TH MINUTES

5:40  PUBLIC COMMENT

5:45  PSE'S CLEAN ENERGY IMPLEMENTATION PLAN PRESENTATION AND DISCUSSION (PSE)
      https://www.cleanenergyplan.pse.com/ceip-documents

6:10  GENERAL UPDATE (AUTUMN SALAMACK)

6:25  SUSTAINABLE TRANSPORTATION METRICS AND SUSTAINABLE CONSTRUCTION TOOLS (NICK SHIACH)
      https://docs.google.com/document/d/1RtD-RJsQD842ugKnrQdQq9eHqLpCiRv2nsKmdvb2W8c/edit?usp=sharing
      https://docs.google.com/spreadsheets/d/14CJZosPhg3uBXerTg7c6kKG9AM_VDawNh9mSg0GvYfc/edit?usp=sharing

6:45  CCAC RECOMMENDATIONS ON COUNCIL REQUEST TO DEFINE AND MEASURE SUSTAINABLE TRANSPORTATION
      PROJECTS (TRANSPORTATION SUBGROUP)

7:05  CLIMATE ACTION PLAN UPDATES
      - WASTE MANAGEMENT AND BIODIGESTER (SUBGROUP)
      - GROUNDWATER MANAGEMENT PLAN (DEB)
      - CAPSTONE STUDENT (MIKE)
      - OTHER

7:30  ADJOURN

**Materials**
1. January minutes
2. PSE Presentation
3. Materials for posting on CCAC website
4. Sustainable Transportation Metrics and link above
5. Link above
6. Recommendations on Council Request to Define and Measure Sustainable Transportation Projects

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**Climate Change Advisory Committee**
**Meeting Minutes**
**Wednesday January 19, 2022**

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Present: Committee members Michael Cox, Steve Richard, Deborah Rudnick, David McCaughey, Julie Matthews, Derik Broekhoff, John Kydd, Lara Hansen, Jens Boemer.

Council Liaison: Kirsten Hytopoulos (joined late), Michael Pollock (new) (not present). Joe Deets is leaving us to take on mayoral role

City Staff: Autumn Salamack

Attendees: Erika Shriner, Kierra Phifer PSE, Andy Swayne PSE, Marci Burkel

No conflict of interest stated.

Approval of December minutes: John moved, Julie seconded, all approve minutes

**Public Comment:**
Erika Shriner: comment on cryptocurrency. Our state is doing nothing about the enormous energy consumption of cryptocurrency, and Washington is identified as a great place for cryptocurrency mining given our low cost energy. Erika's ask is can City Council pass a moratorium on no cryptocurrency mining on the Island. Thinks we need PSE to help monitor and share this with COBI. This is also modeling for our state. Erika will share with CCAC sample moratorium language for us to look at. John mentioned that national council of state educators has a good website on this: ncsl.org (full link to 2021 legislation: https://www.ncsl.org/research/financial-services-and-commerce/cryptocurrency-2021-legislation.aspx)

**Discussion:**
**2022 Climate Officer Check-in– Autumn**
-Internal staff CAP implementation team set up. Autumn will share core team membership with us.
-New city climate change webpages live! https://www.bainbridgewa.gov/1331/Climate-Action
-New weekly video series available, we can propose content for that including climate action
-Hopeful that community climate challenge pieces can pull together by the end of the month
-Mulling over program name possibilities:
      -Resilient Bainbridge
      -Bainbridge Thrives
      -Climate Resilient Bainbridge
      -Climate Smart Bainbridge
A preference expressed by some for Climate Smart Bainbridge or Climate Ready Bainbridge, resilience isn't sufficiently understood and Thrive has some international models, but also may be too vague.

**Reviewed Autumn's Outreach Plan:**
-mentioned the popularity of previous climate forum event on EVs and the "EV petting zoo"
-Importance of letting the community lead on what interests them among the climate action plan issues, that might increase attendance
-Regularity in scheduling is important
-Lead with energy sources as that's the biggest part of our carbon footprint
-Add one possibly on climate resilient planting with community partners
-grad students as a resource for communication and outreach
-waste is a much smaller component of our footprint, let's move up energy conservation and that piece of the pie which is much bigger
-bring together earthquake preparedness and climate preparedness- synergy in awareness and energy
-need to be clear in our terminology: careful and specific about our use of the word resilience and preparing Bainbridge for the impacts of climate change, perhaps preparedness is a better term, but also addressing the here and now

**2021 Progress/2022 Work Plan:**
Acknowledge November is our anniversary for the CAP
Work plan is in the meeting docs- lists completed actions and ongoing subgroups activity
We're supposed to brief City Council, possibly at some point in February, summarizing our 2022 plans.
Steve suggested Autumn come back to group on timeline of implementation and if she needs help- she's incorporating our timeline into her work, moving forward.
We should have a conversation around where CCAC interfaces with staff, through Autumn as much as possible - Autumn will bring back to next meeting.

**Outreach Idea:**
Lara shared conversations with Leslie about an interest in short products that help people understand issues- short videos, graphic-heavy docs, little vignettes. Some ideas: explaining to people why power and transportation are the biggest part of the pie chart and how that works; what are the biggest levers we can move to address these problems; an actual explanation of what will happen to Bainbridge if climate change goes unchecked; what actions can we take as individuals. HS students are required to make short films for film studies, she could speak to the teacher. We could take over a ppt with a voiceover, or we could work with autumn on graphical approaches.
Additional ideas: Art approaches to distributing this information- working with BIMA, BPA that lets people connect aesthetically. Ideas to have this disseminated through social media, then it self-perpetuates if it engages the public.

-Derik is working on updated GHG inventories with King County- focus on consumption-based emissions. Bainbridge will be part of that- Derik can share when report becomes available mid-year.

**CAP Updates:**
*GHG emissions and STTP-* Mike, Derik, Steve, and Deb have been meeting with Mark Epstein in public works and Autumn to develop recommendations for metrics for measuring transportation GHG reductions.

Nick is working on a spreadsheet of programs on sustainable transportation. Steve asked if we think there's a deadline, do we have a time limitation? Mike is looking at this more to help Mark and others on specific asks- we need to get to them to answer their question about specific project metrics- we are coming back with a broader approach; Mike will write up a response to that question and David will move forward to liaisons.

*Waste Management and Biodigester*: Deb updated on ongoing discussions around anaerobic digestion, aerobic digestion, and waste management. Council has Feb 22 scheduled to talk about waste management and biodigester.

*Groundwater Management Plan:* Will discuss at the next CCAC meeting. We had quite the outage-laden meeting so that needs to be rescheduled.

*Capstone Student:* Jackie from UW has been working with Autumn, John, and Mike reached out to Senior Center to have a few focus groups on climate change in March. Key group for implementation.

Jens on **PSE clean energy implementation plan**, published in December. Jens asked some questions of PSE around what we need to pay attention to in this plan that relates to our CAP on the Island. We might consider inviting PSE to give us a deeper dive at CCAC or council meeting. Jens also provided answers in email to committee members
-How do PSE's proposed clean energy targets align with our CAP?
-They are setting up some new incentives for families and multi-family programs, including increase energy efficiency and EV, solar
-A lot of commitment and movement on paper, based on CETA legislation, and now its really up to PSE to put this into action. We have a responsibility to help in the best way we can because electricity is such a big component. Encourages us to review and discuss at a future meeting.
-Could someone from our group consider being a liaison to ongoing PSE meetings?
-Mike thinks they should come to city council and present, because this document is a big deal that the community as a whole should present- perhaps in a study session.

Issue with making sure people know who on CCAC is working on what. Add our subgroups/areas of focus to our webpage? Autumn can check in and see if we can add those to the website. If we get random questions we can't handle, we can forward to Mike or David.

**EcoCity World Summit:**
Will discuss at the next CCAC meeting- Leslie will be attending that, and wanted to know CCAC interest? https://ecocity-summit.com

Thanks to Autumn for all her outreach efforts and thanks to Kirsten for continuing to be our liaison.

Meeting adjourn moved by Derik, seconded by John. Adjourned 7:27 pm.

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_____
Co-Chair           02/16/2022

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# PSE's Clean Energy Implementation Plan (2022-2025)

**Bainbridge Island Climate Change Advisory Committee**

Brian Tyson, Manager of Clean Energy Planning and Implementation, PSE
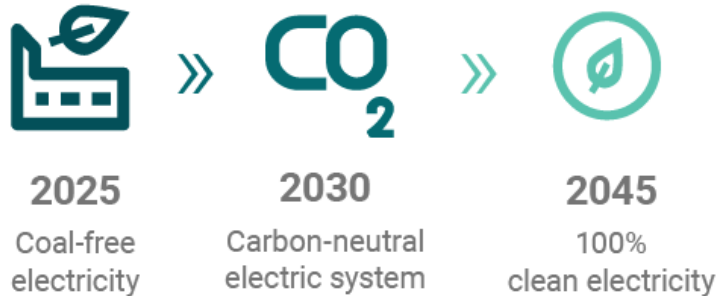
Feb. 16, 2022

PSE PUGET SOUND ENERGY

# Today's agenda

- Provide an overview of PSE's first Clean Energy Implementation Plan (CEIP)

- Share what's next

- Answer questions

PSE PUGET SOUND ENERGY

# Clean Energy Transformation Act (CETA)

Washington's Clean Energy Transformation Act (CETA) goals:

**Achieve clean energy milestones**

2025
Coal-free electricity

2030
Carbon-neutral electric system

2045
100% clean electricity

**Ensure all customers benefit**
Through:
- o Equitable distribution of energy and non-energy benefits and reduction of burdens to vulnerable populations and highly impacted communities
- o Public health and environmental benefits
- o Reduction of costs and risk
- o Energy security and resiliency

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# PSE electric resource planning process

**Integrated Resource Plan**
20+ year resource plan

**Clean Energy Action Plan**
10-year strategy
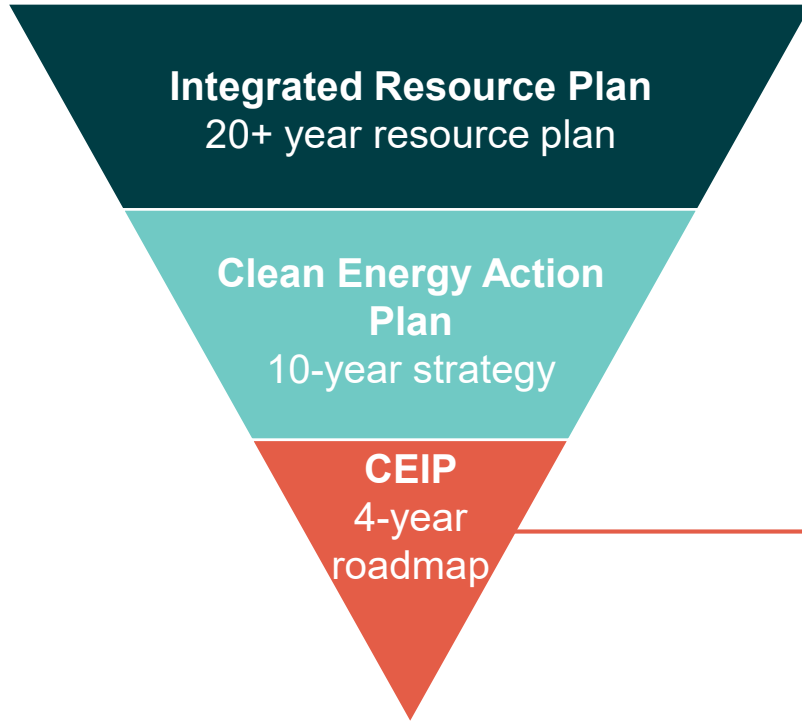
**CEIP**
4-year roadmap

- Our Clean Energy Implementation Plan (CEIP) is a **new plan** required by CETA

- Four-year plan that **guides PSE's clean electricity programs, actions and investments for 2022-2025**

- This is the first of many plans, as the energy resource planning **process is a continuous, iterative cycle**

- **CEIP filed on Dec. 17, 2021**. UTC will approve, deny or modify the plan

**PSE** PUGET SOUND ENERGY

# PSE's first Clean Energy Implementation Plan (2022-2025)

Defines targets to achieve our clean electricity goals

Identifies how all customers benefit with focus on highly impacted communities and vulnerable populations

Uses customer benefits to shape our resource decisions and enhance the clean electricity transition

Lists specific actions, programs and investments

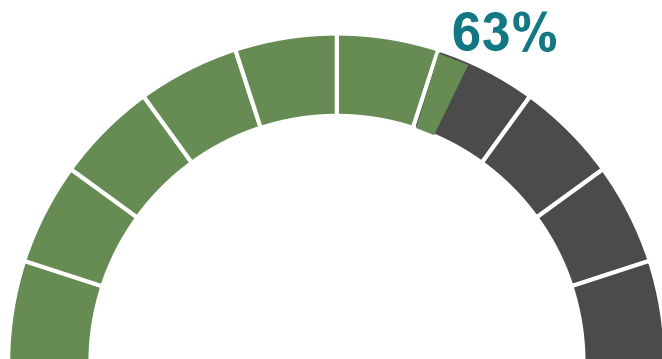Maintains reliability and affordability

Describes how we engaged customers in our efforts

Holds PSE accountable to future work and commitments

PSE PUGET SOUND ENERGY

# Moving faster, with more renewables and local resources

## Interim clean electricity target

**63%**

PSE clean electricity portfolio forecast by **end of 2025***

*measured as a % of net retail load*

## Specific targets

**Energy Efficiency: 1,073,434 MWh** for 2022-2025
*Equivalent to electricity used by more than 138,000 homes in one year*

**Demand response: 23.7 MW**
*New programs incentivizing shifting energy use during peak periods*

**Renewable Energy: 63%** of retail sales in 2025
- *Large-scale generation, like wind and solar*
- *2x as much local solar and battery programs than today*

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*MW: Megawatt*
*MWh: Megawatt hour*

# Insights into highly impacted communities and vulnerable populations
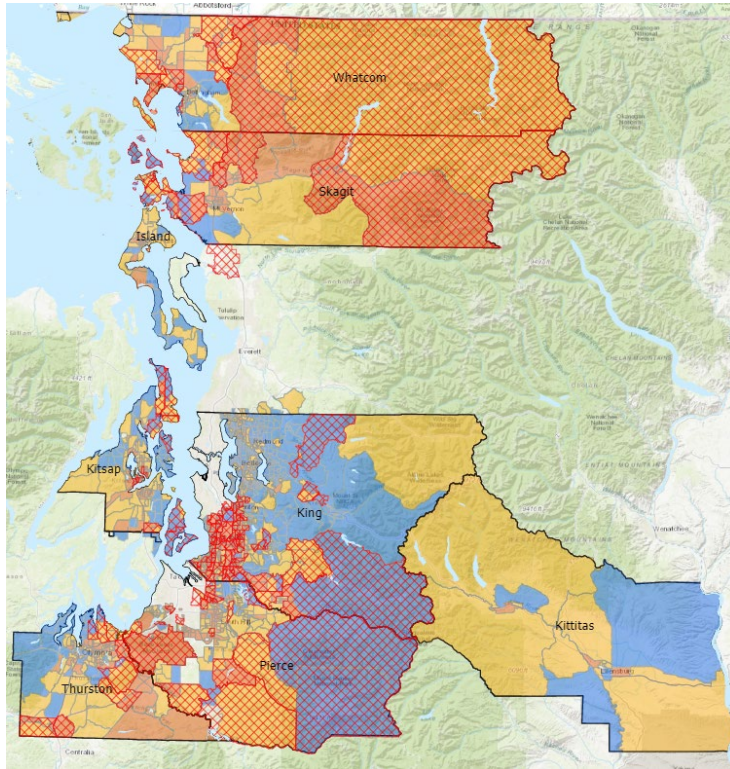

*PSE electric service area*

These insights will help us **ensure equitable distribution of benefits** by:

- Identifying existing disparities

- Measuring and tracking progress in addressing disparities

- Understanding and including specific needs in:
    - Education and awareness
    - Resource acquisition process
    - Program design

**Named Community Classification**
- Highly Impacted Community
- High Level Vulnerability
- Medium Level Vulnerability
- Low Level Vulnerability

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# Customer benefit indicators shape outcomes

**Highly impacted communities and vulnerable populations**
(named communities)

**Energy benefits**
• Improved participation in clean energy programs from named communities

**Reduction of burdens**
• Improved participation in clean energy programs from named communities
• Improved affordability of clean energy
• Increase in culturally- and linguistically-accessible program communications for named communities

**Non-energy benefits**
• Improved participation in clean energy programs from named communities
• Increase in quality and quantity of clean energy jobs
• Improved home comfort

**All PSE customers** (including highly impacted communities and vulnerable populations)

**Public health**
• Improved outdoor air quality
• Improved community health

**Environment**
• Reduction of greenhouse gas emissions
• Reduction of climate change impacts

**Cost reduction**
• Improved affordability of clean energy

**Energy security**
• Improved access to reliable clean energy

**Risk reduction**
• Reduction of climate change impacts
• Improved access to reliable clean energy

**Resiliency**
• Decrease frequency and duration of outages

Customer benefit indicators:

• Outcomes that improve our customers' lives

• Shape program, actions and investment decisions

• Help ensure all customers benefit from the clean electricity transition

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# Resource investment areas and actions

## Energy Efficiency

- Developed through Biennial Conservation Plan
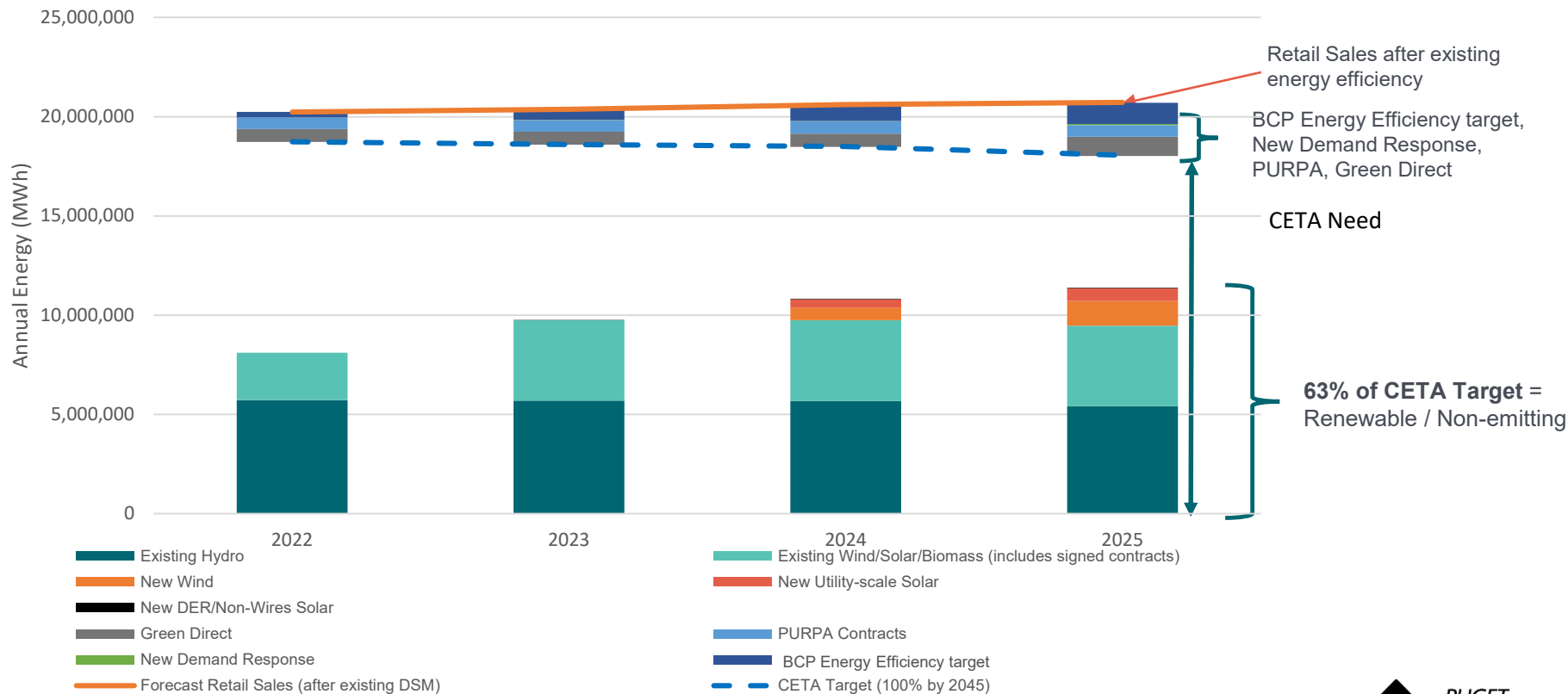- Customers reduce bills, and PSE reduces total system cost

## Demand Response

- Includes incentive programs for customers to reduce energy use at peak periods
- Programs determined through Targeted Distributed Energy Resources (DER) request for proposal (RFP)
- Customers reduce bills, and PSE reduces total system cost

## Renewable Energy

- Includes large-scale wind and solar generation, along with distributed solar and battery storage
- Resources determined through All-Source and Targeted DER RFPs
- Decreases emissions and increases local resiliency, ownership and access

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# 2022-2025: CETA clean electricity mix



Retail Sales after existing energy efficiency

BCP Energy Efficiency target, New Demand Response, PURPA, Green Direct

CETA Need

**63% of CETA Target** = Renewable / Non-emitting

Annual Energy (MWh)

25,000,000
20,000,000
15,000,000
10,000,000
5,000,000
0

2022    2023    2024    2025

**Legend:**
- Existing Hydro
- Existing Wind/Solar/Biomass (includes signed contracts)
- New Wind
- New Utility-scale Solar
- New DER/Non-Wires Solar
- Green Direct
- PURPA Contracts
- New Demand Response
- BCP Energy Efficiency target
- Forecast Retail Sales (after existing DSM)
- CETA Target (100% by 2045)

10    2021 CEIP – February 2022

*PSE PUGET SOUND ENERGY*

*\* BCP – Biennial Conservation Plan*
*PURPA – Public Utility Regulatory Policies Act Qualifying Facility*

# Specific actions: what customers can do today

**PSE's existing clean electricity programs continue in our CEIP for 2022-2025**

- Energy Efficiency programs for homes and businesses
- Voluntary renewables:
    - Solar Choice (solar match)
    - Green Power (renewable match)
    - Green Power Solar Grants
    - Customer Connected Solar (net metering)
    - Green Direct (business match) – CEIP proposes additional MWs
    - Community Solar – CEIP proposes additional MWs



*Source: Energy.gov*

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# Highlighting new, conceptual, and pilot programs

## Distributed Energy Resources (DERs)

Conceptual programs*:
- Multi-family rooftop solar incentive
- Multi-family solar partnership
- Residential rooftop solar leasing**
- Commercial and Industrial rooftop solar incentive
- PSE customer-sited solar + storage offering**
- Third-party solar power purchase agreement (PPA)
- Residential battery leasing
- C&I space leasing for batteries

## Demand Response

- Residential direct load control (DLC) – switch, bring your own thermostat, and grid enabled water heaters
- Medium Commercial DLC heat – switch
- Time-varying rates pilot program

*Source: Energy.gov*

*Final program designs to be determined through Targeted DER RFP process
**Includes income-eligible offerings*

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# Customers, advisory groups, and stakeholders shaped the CEIP

Convened and engaged Equity Advisory Group – new!

**35+** CEIP-focused meetings with advisory groups, community-based organizations, and other stakeholders

**1,000+** Respondents to clean electricity values and benefits community survey

**350+** Comments on draft CEIP

## Outcomes

- Accelerated clean electricity transition – increasing from draft 59% to 63% clean in final

- Expanded definition of vulnerable populations

- Identified burdens, barriers and opportunities

- Development of customer benefit indicators and metrics

- Shaped specific actions and programs

- Broadened public engagement and clean energy education

- Created guiding principles for CEIP implementation

PSE
*PUGET SOUND ENERGY*

# Next steps to delivering clean electricity



2021 | 2022 | 2023 | 2024 | 2025

★ Final CEIP filed
● 2023 CEIP update
★ 2025 CEIP

UTC comment period & decision

Procurement of clean energy resources

Customer-facing program design

Clean energy resources and programs deployed

Energy Efficiency Programs

Energy Efficiency Programs

Ongoing customer outreach, education and engagement

14 | 2021 CEIP – February 2022

*UTC: Washington Utilities and Transportation Commission*

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# Working together for a clean electricity future

**UTC comment period through March 2, 2022**

- UTC will decide whether to approve, deny or modify PSE's CEIP

- PSE's CEIP is in [UTC Docket UE-210795](). To file a written comment, visit: [www.utc.wa.gov/e-filing]()

**Actions you can take now to decarbonize**

- Match your energy use with local renewables – enroll in our Community Solar, Green Power and Solar Choice programs at [pse.com/renewables]()
- Reduce your energy use and lower your bill – find rebates for energy efficient upgrades for homes and businesses at [pse.com/rebates]()
- Stay tuned for more on new programs!

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# Stay informed and involved

Get the latest news, involvement opportunities and subscribe for email updates: **cleanenergyplan.pse.com**

Email us at **ceip@pse.com**

Leave a message at **(425) 818-2051**



"*Solar Moonlight" by Barry Blankenship of Bremerton, WA*

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# Appendix

# Common acronyms

| Acronym | Meaning |
| --- | --- |
| CBI | Customer benefit indicator |
| CEAP | Clean Energy Action Plan – 10-year strategy |
| CEIP | Clean Energy Implementation Plan – 4-year roadmap |
| CETA | Clean Energy Transformation Act, which set clean electricity standards for Washington |
| C&I | Commercial and industrial |
| DER | Distributed energy resource, e.g., rooftop solar & small-scale battery storage |
| DR | Demand response, e.g., incentive programs for customers to reduce their energy use at peak periods |
| EAG | Equity Advisory Group |
| HIC | Highly Impacted Communities |
| IRP | Integrated Resource Plan – 20+ year resource plan |
| Named Communities | Refers to "Highly Impacted Community" and "Vulnerable Populations" (defined by CETA) |
| PPA | Power purchase agreement |
| RFP | Request for proposal |
| SWMBE | Small-, woman-, and minority-owned businesses |
| UTC | Washington Utilities and Transportation Commission, which regulates PSE |
| VP | Vulnerable Populations |

# CEIP highlights

**2022-2025:**

- **Interim Target** of <u>63%</u> (up from 59% in the draft CEIP)
- **Renewables:** 800 MW target for renewables
- **Energy Efficiency:** 1,073,434 MWh target for energy efficiency (consistent with 2022-2023 Biennial Conservation Plan)
- **Demand Response:** 23.7 MW target for demand response
- **Distributed Resources:** Establishes a sub-target consisting of:
  - 80 MW distributed solar
  - 25 MW distributed battery storage
- **Battery storage:** 50 MW of utility-scale storage
- **Incremental Cost:** Projected just above 2% incremental cost threshold over the 4 years

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# Summary of actions that move us forward

| | 2022 | 2023 | 2024 | 2025 |
|---|---|---|---|---|
| **Resource specific (projected)** | • Energy Efficiency Programs<br>• Complete Targeted DER RFP<br>• 200 MW Golden Hills wind in service*<br>• 100 MW BPA capacity product*<br>• 32.8 MW Colville and 76.6 MW Chelan hydro contracts*<br>• Complete All-Source and Targeted DER RFPs<br>• 7 MW of DER solar in service | • Energy Efficiency Programs<br>• Start Demand Response Programs<br>• 350 MW Clearwater Wind in service*<br>• 23 MW of DER solar in service<br>• 5 MW of distributed battery storage in service | • Energy Efficiency Programs<br>• Expand Demand Response programs<br>• 200 MW of wind in service<br>• 200 MW of solar in service<br>• 25 MW of utility-scale storage<br>• 25 MW of DER solar in service<br>• 7 MW of distributed battery storage in service | • Energy Efficiency Programs<br>• Expand Demand Response programs<br>• 300 MW of wind in service<br>• 100 MW of solar in service<br>• 25 MW of utility-scale storage<br>• 25 MW of DER solar in service<br>• 13 MW of distributed battery storage in service |
| **Other investments** | • Begin tariff filings for DER programs<br>• Customer-centered program design<br>• Baseline data collection for CBIs<br>• Enabling technologies planning | • Tariff filings for DER programs<br>• Build and deploy new DER and DR programs<br>• Initial customer programs and education launch<br>• Begin installing enabling technologies<br>• Progress reporting and biennial CEIP Update | • Utility-scale renewables and DERs in service<br>• Progress reporting<br>• Ongoing programs and education<br>• Ongoing installation of enabling technologies | • Utility-scale renewables and DERs in service<br>• Ongoing programs and education<br>• Ongoing installation of enabling technologies<br>• File 2026–2029 CEIP |

*\* CETA-eligible resources already underway (see CEIP Figure 1-3)*

# Customer Benefit Indicators and metrics

*New/updated in December filing
*CETA benefit category

**Energy**
**Non-energy**
**Burden reduction**

**Improved participation in clean energy programs from highly impacted communities and vulnerable populations**
- Increase percentage of participation in energy efficiency, demand response and distributed resource programs or services by PSE customers within highly impacted communities and vulnerable populations
- Increase percentage of electricity generated by distributed renewable energy projects

**Non-energy**

**Improved home comfort**
- Increase dollars in net present value (NPV) in non-energy impact (NEI) benefits for energy efficiency programs (based on estimated lifetime value of NEIs)

**Non-energy**

**Increase in quantity and quality of clean energy jobs**
- Increase quantity of jobs based on:
  - Number of jobs created by PSE programs for residents of highly impacted and vulnerable populations
  - Number of local workers in jobs for programs
  - Number of part-time and full-time jobs by project
- Increase quality of jobs based on:
  - Range of wages paid to workers
  - Additional benefits offered
  - Demographics of workers

**Burden reduction**

**Increase in culturally- and linguistically-accessible program communications for named communities***
- Increase outreach material available in non-English languages

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# Customer Benefit Indicators and metrics

**Affordability**

**Improved affordability of clean energy**
- Reduce median electric bill as a percentage of income for residential customers
- Reduce median electric bill as a percentage of income for residential customers who are also energy-burdened

**Environment
Risk reduction**

**Reduction of climate change impacts**
- Increase avoided emissions times social cost of carbon

**Resilience**

**Decrease frequency and duration of outages**
- Decrease number of outages, total hours of outages and total backup load served during outages using SAIDI and SAIFI
- Reduce peak demand through demand response programs

**GHG**

**Environment**

**Reduced greenhouse gas emissions**
- Reduce PSE-owned electric operations metric tons of annual $CO_{2e}$ emissions
- Reduce PSE contracted electric supply metric tons of annual $CO_{2e}$ emissions

**Public health**

**Improved outdoor air quality**
- Reduce regulated pollutant emissions (SO2, NOx, PM2.5)

**Public health**

**Improved community health**
- Reduce the occurrence of health factors like hospital admittance, and work loss days (using hospital discharge rates as a proxy)

**Risk reduction
Energy security**

**Improved access to reliable clean energy***
- Increase number of customers who have access to emergency power (through net metering and battery storage)

**PSE** *PUGET SOUND ENERGY*

# PSE's ongoing work for the 2023 biennial CEIP update

- **Incorporate the analysis** contained in the **2023 Electric Progress report and results of the 2021 All-Source and 2022 Targeted DER RFPs**

- Develop the building blocks for an **equity assessment for 2023 CEIP update**:

Continue to develop **data sources for CBIs and baseline data**

**Assess and measure disparities** within existing programs and **understand root factors causing disparities**

**Engage** highly impacted communities and vulnerable populations **on program design**

**Report on progress for next CEIP:**
- **Potential CBIs on**:
  - Fish and wildlife impacts
  - Wildfire impacts
  - Sense of pride and self sufficiency
  - Indoor air quality
- **Methodology for scoring and weighting CBIs**

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# Materials for Posting on CCAC Website

https://www.bainbridgewa.gov/922/Climate-Change-Advisory-Committee

Would CCAC members like these (or other materials) posted on the website?

- CCAC and UAC Recommendations on PSE Franchise Agreement February 18th 2021

- CCAC Sea Level Rise Response - Staff memo for CC 06152021

- Climate Change Advisory Committee: Comments and Recommendations on Council Direction on Sea Level Rise Amendments as part of the Shoreline Master Program Periodic Review (June 5th 2021)

- Memo Waste Management CCAC to City Council December 15th 2021

- Grant Opportunities for Climate Change and Sustainable Transportation

- CAP and Sustainable Transportation Grant Opportunity Spreadsheet

- Any of the draft Roadmap documents developed by CCAC members
    - EV Charging Immediate Action #14
    - Primary Heating Immediate Action #8
    - Clean Energy and Building Fund November 23rd 2020
    - Climate Change Certification Tool November 23rd 2020
    - COBI transition to EVs November 23rd 2020
    - GHG Inventory November 23rd 2020
    - Climate Change Website November 23rd 2020

Date: February 11th, 2022

To: Bainbridge Island City Council

From: Climate Change Advisory Committee

Subject: Recommendations in Response to Council Request to Define and Measure Sustainable Transportation Plan Projects

Request from City Council

At the October 19, 2021, City Council meeting, the Council expressed an interest discussing a proposal for defining and measuring Sustainable Transportation Plan projects. The proposal was stated as follows:

> *Define sustainable transportation to mean an action related to transportation that is likely to result in a reduction in greenhouse gas emissions within a ten-year time frame. This will require that the city estimate the reduction in GHGs due to a reduction in car trips/car miles traveled resulting from a sustainable transportation project. It will also require that the city estimate the GHGs embodied in the materials used in a project (e.g., concrete) and in the GHGs produced during the planning/construction process.*

As a follow-up, on October 25th, the Public Works Director provided a memo to the City Council on his recommendations on how to proceed.

Recommendation from Public Works Director on how to proceed

Based on the Council's discussion on October 19th this item could be referred to Climate Change Action Committee (CCAC) for consideration and development of a recommendation for the Council's future consideration.

The CCAC discussion could consider the two main points in the recommendation, recognizing that providing infrastructure that supports reduced vehicle-miles traveled (VMT) in the community is a critical action to support the Climate Action Plan.

Specifically, the CCAC could investigate and recommend options for estimating reduced VMT associated with projects, like new bicycle facilities, including identifying the resources needed to collect data specific to each project location and/or agree to a set of assumptions to complete those calculations. Additionally, the CCAC could develop steps that should be taken to make infrastructure as sustainable as possible, which includes looking at environmental impacts, long term durability and maintenance costs associated with different materials and methods of design/construction - potentially using existing certifications or other programmatic calculators.

The Committee will also want to consider thresholds for project sizes, types, materials, location, etc. to ensure a meaningful effort that is aligned with available staff and financial resources.

CCAC Recommendations

We have included our recommendations below based on our work with City of Bainbridge Island (COBI) staff and research on the best practices and methods on performance metrics for sustainable transportation with an emphasis on how to measure greenhouse gas (GHG) emissions reductions.

1. Focus on estimating the reductions in GHG emissions at the systems level instead of the looking at individual projects.

Trying to evaluate the GHG reductions on an individual project level would be challenging, potentially quite expensive, and more importantly, could be misleading. For example, various projects combined may reinforce each other and achieve deeper reductions than any single project in isolation.

The goal should be to achieve systemic improvements in GHG emission reductions. Each project should be evaluated for its consistency with a predefined vision for such improvements, resulting in an Island-wide, low-carbon transportation system. To the extent GHG emissions are assessed, this should be done in the context of defining this vision and/or selecting among different designs and options for system-wide improvements.

CCAC also recommends using the Climate Change Adaptation Certification Tool developed by EcoAdapt, which is already being used by COBI in other planning efforts to ensure that planning accounts for needed adaptations to expected or likely changes in climate.

2. Do not focus on embedded emissions.

While the GHGs embodied in the materials used for transportation projects can sometimes be significant, they are typically small compared to the reductions that would be achieved through realizing a more connected, multimodal, low-carbon transportation system.

Furthermore, if the goal is to assess the relative change in GHG emissions associated with realizing this kind of system, compared to a baseline, then embedded emissions should be assessed in the same way. That is, the emissions associated with constructing low-carbon transportation system improvements need to be compared to emissions that would arise if funds were spent differently (e.g., on conventional projects like road construction, or simply spent on a generic "basket" of other goods and services).

In most transportation planning contexts, the difference in embedded emissions is typically considered a wash, given that infrastructure spending of one sort or another typically will have a similar carbon intensity. Where consideration of embedded emissions *does* become important is in choosing among different design options for transportation projects and systemic improvements.

In general, lower-carbon and more material-efficient design options should be preferred. This should be considered in identifying options for system-wide improvements.

3. If there is a desire to have a definition for sustainable transportation, we would suggest the following.

> *Sustainable transportation is a comprehensive approach that considers and incorporates the full social and environmental costs of transportation while providing services that meet community transport and mobility needs; when considered specifically in relation to climate change mitigation, sustainable transportation contributes to a systemic reduction in greenhouse gas emissions, relative to a baseline scenario describing the most likely alternative(s) if the action is not implemented.*

4. Complete a report on different possible performance metrics that could be considered by COBI for measuring GHG emission reductions from transportation projects.

The CCAC and COBI staff have conducted considerable research on what performance metrics other jurisdictions (e.g., Redmond, Federal Way, Bellevue, and Bellingham) are using to evaluate GHG emission reductions for their transportation projects. This research also included conversations with the Puget Sound Regional Council, the Washington State Department of Transportation, several consulting firms, and University of Washington professors to gain a better understanding of what performance metrics they would suggest to evaluate GHG emissions reductions.

The CCAC will complete a report summarizing all the research that was done and submitted that to the City Council and COBI. The report will provide information on the different possible performance metrics (e.g., vehicle miles traveled, mode share, sketch models, and Goggle Environmental Insights Explorer data) that could be used to evaluate GHG emission reductions.

5. Hire a consulting firm to develop a baseline understanding of our Islands vehicle miles traveled (VMT) and develop a tool to allow us to evaluate what actions will provide the greatest reductions in GHG emissions associated with VMT reductions over time.

Based on our discussions, we are recommending that COBI hire a consultant to:
- Develop a baseline evaluation for VMT for the Island;
- Develop a tool to help evaluate what actions will provide the greatest reductions in GHG emissions now and;
- Use that tool to evaluate potential future reductions in VMT related to transportation.

We believe this is important to ensure our GHG emissions inventory is as accurate as possible for transportation. One of the criticisms of the GHG emissions inventory for transportation was that the data we relied on was downscaled to Bainbridge Island from Kitsap County data. We believe the consultant could assist in improving the GHG emissions inventory for transportation.

In addition, we believe they could help to develop tools that would provide COBI with information on the most effective strategies for reducing GHG emission reductions from transportation (e.g., developing walk and biking infrastructure, developing electric vehicle infrastructure, and/or modifying land use and zoning requirements).

6. CCAC will complete a report that identifies different tools that COBI Staff could use for evaluating the sustainability of different transportation projects.

The CCAC is working with COBI staff to conduct research on the best methods to make transportation infrastructure as sustainable as possible. This includes looking at environmental impacts, long-term durability and maintenance costs associated with different materials and methods of design/construction.

The goal of the research is to provide a checklist for potential projects that could guide decision making towards the most sustainable choices. We are developing a matrix of potential tools that will include the following information: 1) description of tool; 2) type of project tool is designed for; 3) what cities have used the tool; 4) costs to develop/use tool; 5) data inputs needed for tool; 6) outputs from tool; 7) possible support provided to COBI from the tool developer; and 8) contact information.

We believe the recommendations suggested above will provide the information needed to determine if the project is aligned with the vision for system-wide improvements and evaluate if we are meeting the goals established in the Climate Action Plan for reducing GHG emissions.

We would be happy to discuss our recommendations with the Council if desired.

| Tool Name | Company/Org | Description | Type of tool | Used By | Type of projects | Cost to use | Inputs/Requirements | Outputs | Date created/updated | Support provided? | Contact | Website |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Bolded tools are most promising** | | This color indicates that the tool is not in the other tab | Calculators, certifications, standards | Intended and actual users | | Access and certification fees. Does not include other costs associated with required components. | What needs to be accomplished/produced/furnished to complete the process? | End result of the process/program | Recency of creation/update might indicate whether or not the program is active and taken care. | Is support built in or specifically offered? | | |
| **King County Emissions Calculator** | King County | The King County Emissions Calculator converts common project data inputs, as well as the various emissions outputs from six other tools, into a common unit (MTCO2-e) and then combines them into one comprehensive emissions estimate for your project. This calculator contains a worksheet (Excel tab) for each of the four required items of measurement (energy, water, C&D and transportation), as well as for embodied carbon from major construction materials, and a worksheet for each of the third-party tools described below. However, this tool is outdated by several years, so see the Inputs/Requirements tab for the updated constituent tools. | Attributional Emissions Calculator | King County. County-owned or lease-to-own capital projects. | Capital infrastructure projects | Free | be completed, if applicable. 1. Waste Reduction Model (WARM): EPA tool estimates GHG emissions from disposal of waste, including the distance to the disposal sites and lifecycle impacts of disposal choices. New site: https://www.epa.gov/warm 2. URBEMIS 2007: From the State of California, can estimate construction, area source, and emissions from a wide variety of land use projects. Now called CalEEMod: http://www.aqmd.gov/caleemod/user's-guide 3. Roadway Construction Emissions Model: Construction equipment emissions estimated using a tool from the Sacramento Metro Air Quality Management District. Now called Construction Mitigation Tool: http://www.airquality.org/Businesses/CEQA-Land-Use-Planning/Mitigation 4. Build Carbon Neutral: Estimates the embodied energy of building materials, construction processes, and landscape disturbance or installation/restoration, for building projects. http://www.buildcarbonneutral.org/ 5. Tree Carbon Calculator: The US Forest Service Center for Urban Forestry Research quantifies carbon sequestration from tree planting projects, as well as estimating the climate benefits from reduced heating and cooling energy usage, if trees are used to shade buildings. Primarily for estimating sequestration, rather than emissions. This calculator appears to be defunct. | MTCO2-e (metric tons of carbon dioxide equivalent) generated from potential projects before and after a mitigation strategy. Mitigation strategies are provided. | 2014. See Inputs/Requirements for updated constituent tools. | No | | Download calculators starting on page 9: https://kingcounty.gov/~/media/depts/dnrp/solid-waste/green-building/documents/emissions-guidelines.ashx?la=en |
| **Urban Bikeway Design Guide** | National Association of City Transportation Officials (NACTO) | This 260-page report provides recommendations for the development of bikeways based on the consensus of the best practices, derived from cities that have implemented successful bike infrastructure. | Best Practices/ Advisory | Cities and communities | Bike infrastructure | Summary: Free Full guide: $55 per copy | N/A | Advice, ideas for checklists, and a good sense of best practices | March 2014 | Not specifically | https://nacto.org/people/staff/ | https://nacto.org/publication/urban-bikeway-design-guide/ |

| Tool Name | Company/Org | Description | Type of tool | Used By | Type of projects | Cost to use | Inputs/Requirements | Outputs | Date created/updated | Support provided? | Contact | Website |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Bolded tools are most promising** | | This color indicates that the tool is not in the other tab | Calculators, certifications, standards | Intended and actual users | | Access and certification fees. Does not include other costs associated with required components. | What needs to be accomplished/produced/furnished to complete the process? | End result of the process/program | Recency of creation/update might indicate whether or not the program is active and taken care. | Is support built in or specifically offered? | | |
| **Climate Change Adaptation Certification Tool (CCAC)** | Climate Adaptation Knowledge Exchange (Cake) | Developed in the Puget Sound region, this checklist from a nonprofit seeks to help cities and businesses with climate change decision-making. Evaluates the vulnerability of potential projects to climate change effects. For transportation projects, GHGe are considered, specifically decreasing congestion and trips. | Best Practices/Advisory | Local government, bussinesses, and individuals | applied to any decision that uses public funds, has a life cycle of greater than five years and can impact public good. This includes, but is not limited to: • Fiscal Expenditures • Capital Planning • Permitting • Infrastructure Design and Siting | Free | Detailed project information, along with subjective determinations based on local context, to determine if the project is affected by any of 8 climate risk factors. | Climate change risk factors are properly considered and minimized. | December 2018 | No | Justus Nordgren, S., and L.J. Hansen | https://www.cakex.org/sites/default/files/2018EcoAdapt%20CCAC%20Tool%20FINAL_SPREADS.pdf |
| Leadership in Energy and Environmental Design (LEED) for Cities and Communities | U.S. Green Building Council | LEED certification is known for encouraging sustainable design for buildings and offering a scorecard of metrics that make buildings more sustainable. They also offer a similar product for cities and communities that takes transportation, energy, and many other factors into account. For transportation, the main metric is daily VMT per person. Bellevue, King County, Seattle, and Tacoma are certified. | Certification/Rating System | Cities and communities | Entire city, encompassing impacts of completed and future projects | $2,500 registration for members ($750 annual membership fee) $5,000 for non-members. Certification review fees depend on the project/applicant | Each credit or metric has unique input requirements: https://www.usgbc.org/credits?Version=%22v4.1%22&Rating+System=%22Cities+-+Plan+%26+Design%22 | LEED certification for the city | Current | Yes | cities@usgbc.org | https://www.usgbc.org/leed/rating-systems/leed-for-cities |
| **The Greenroads Rating System** | Greenroads International, started at the University of Washington | sustainability on transportation projects. The program measures transportation infrastructure project's environmental, social, and economic performance with an expert, third-party review. Not for prioritization as much as it is for making a specific project as sustainable as possible. Getting started: https://www.greenroads.org/gettingstarted.html | Certification/Rating System | Cities and DOTs, and consultants | Transportation infrastructure, mostly roads (usually complete streets), sometimes pedestrian-only infrastructure. | Can be in the thousands, but depends on the size and duration of the project: https://www.greenroads.org/628/project-fees.html | Points are awarded across 5 categories: Environment and Water, Materials and Design, Construction Activities, Access and Livability, and Utilities and Controls. Sub-categories can be found here: https://www.greenroads.org/files/10418.pdf | 4 certification levels | Created 2010, guidebook updated 2020 | Yes | Bottom of page: https://www.greenroads.org/2286/who-we-are.html | https://www.greenroads.org/publications |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Bolded tools are most promising** | | This color indicates that the tool is not in the other tab | Calculators, certifications, standards | Intended and actual users | | Access and certification fees. Does not include other costs associated with required components. | What needs to be accomplished/produced/furnished to complete the process? | End result of the process/program | Recency of creation/update might indicate whether or not the program is active and taken care. | Is support built in or specifically offered? | | |
| **Envision Sustainable Rating System** | Institute for Sustainable Infrastructure | Envision is a holistic sustainability framework and rating system that enables a thorough examination of the sustainability and resiliency of all types of civil infrastructure. According to their website, it is the only comprehensive tool in North America that can assist government agencies and their consultants and contractors in delivering infrastructure that tackles climate change, addresses public health needs, cultivates environmental justice, creates jobs, and spurs economic recovery. | Certification/ Rating System | Public agencies, nonprofits, companies | All types and sizes of civil infrastructure, including active transportation and green infrastructure | Membership is free. Credentialing fees: $250 for training and $50 for renewal. Verification fees depend of whether it is a post or pre-construction verification and how expensive the project is. For projects less than $5 million, verification is $11,000 or $14,000. | Envision measures human well-being, mobility, community development, collaboration, planning, economy, materials, energy, water, siting, conservation, ecology, emissions, and resilience. Points are awarded in 5 categories: Quality of Life, Leadership, Resource Allocation, Natural World, and Climate and Resilience. | Certification | The company started in 2010. Envision is the main aspect of the company. | Yes | 202-991-1190 https://sustainableinfrastructure.org/contact-us/ | https://sustainableinfrastructure.org/envision/use-envision/ |
| CEEQUAL | BRE Group | CEEQUAL is a sustainability assessment tool for infrastructure and civil engineering projects. They train you and then you self-assess. The company assigns one of their verifiers to your project. Global company headquartered in UK. | Certification/ Rating System | Public and private sector | infrastructure, landscaping and public realm projects and contracts of any size or description. They have helped a vast range of projects achieve and certify their sustainability goals, including structures, groundworks, transport projects, energy, water, waste, and major projects. | Must contact for quote. CEEQUAL fees could depend on several factors: 1. Contract value of the project or contracted works 2. Client's or engineer's estimate 3. Type of assessment | Points awarded across 8 categories: management, resilience, communities and stakeholders, land use and ecology, landscape and historic environment, pollution, resources, and transport. | Certification | Company founded in 1921 | Yes | 0330 134 5724 https://www.bregroup.com/products/ceequal/contact-ceequal/ | https://www.bregroup.com/products/ceequal/?cn-reloaded=1 |
| King County Sustainable Infrastructure Scorecard | King County | Created for King County Divisions to comply with the county's Green Building and Sustainable Development Ordinance. Captial projects in the county must use this scorecard, LEED, or another approved green building rating system, including Built Green 4 Star, Living Building Challenge, Evergreen Sustainable Development Standard, Sustainable Sites, and Salmon Safe. The purpose of this scorecard is to integrate cost-effective sustainable development practices into infrastructure projects. Projects that involve only renewable energy or energy efficiency improvements do not need to use the scorecard. | Certification/ Rating System | King County. County-owned or lease-to-own capital projects. | All capital infrastructure projects, even when the scope of the project is too small for LEED certification. | Free | 1. List green building and sustainable development strategies employed 2. Projected and actual waste diversion rate 3. Environmentally preferable products used 4. Projected and actual energy savings 5. Projected and actual water savings 6. Projected and actual GHG savings 7. Additional costs associated with certification 8. Operations and maintenance costs projected 9. Report of fiscal performance including project costs and benefits | Certification at a platinum, gold, silver, or bronze level | September 2014 | No | | https://kingcounty.gov/~/media/depts/dnrp/solid-waste/green-building/documents/sustainable-scorecard-guidelines.ashx?la=en |

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| Living Building Challenge | International Living Future Institute (ILFI) | The Living Building Challenge seeks to make infrastructure as positive as possible for the environment using innovative and context-driven strategies. They provide a project team coach, status calls, technical resources, 3rd party audits, and ultimately, recognition through certification. | Certification/ Rating System | Public and private sector | Buildings and landscape and infrastructure such as parks, roads, bridges, plazas, sports facilities, or trails. | Cost is based on square footage. For 100,000 square feet, the cost for the full program is $0.15 per square foot, which would be $15,000. | The scorecard is divided into 7 categories: Place, Water, Energy, Health+Happiness, Materials, Equity, and Beauty. Download details: https://www2.living-future.org/LBC4.0?RD_Scheduler=LBC4 | Certification | Endorsed by US Green Building Council in 2006 and continually updated. | Yes | sales@living-future.org  Send a message by clicking on the question mark icon in the bottom right of their site. | https://living-future.org/lbc/ |
| **Salmon-Safe** | Pacific Rivers | As a leading U.S. ecolabel, Salmon-Safe offers peer-reviewed certification, linking site development and land management practices with the protection of agricultural and urban watersheds. Seeks to integrate principles of low impact development (LID). Eligbe for projects in Washington, Oregon, and BC. | Certification/ Rating System | Farmers, urban developers, builders, land managers | Urban development, farms, parks, golf courses, and infrastructure. Infrastructure includes large-scale transportation, mass transit, green streets, and stormwater management. | | For a site to be eligible for certification, an agency or project proponent must demonstrate a commitment to going beyond regulatory compliance to reduce and address the impacts of the proposed infrastructure project on sensitive aquatic and natural resources. The certification evaluation is conducted by a science team of qualified, independent experts hired by Salmon-Safe. | 5 year certification | Since 1997. Infrastructure development standards updated May 2018. | Yes. Salmon-Safe provides design review, construction-phase pollution prevention verification, and guidance related to longterm project operation. | https://salmonsafe.org/contact/  Form near bottom of this page: https://salmonsafe.org/certification/large-scale-infrastructure/ | https://salmonsafe.org/get-certified/ |
| GreenLITES | New York State DOT | Designed for New York agencies and local governments to certify the sustainability of transportation projects. | Certification/ Rating System | New York State agencies | Transportation projects | Free | | Certification on gold, silver, brinze levels | 2008, updated periodically | No | Paul Krekeler (GreenLITES@dot.ny.gov). | https://www.dot.ny.gov/programs/greenlites/project-design-cert |
| The Sustainable SITES Initiative | Green Business Certification Inc. (GBCI) | Rating system designed to identify sustainable landscapes, measure their performance, and increase their performance. It is a sustainability-focused framework that encourages practices that protect ecosystems and enhance the mosaic of benefits they continuously provide our communities, such as climate regulation, carbon storage and flood mitigation. | Certification/ Rating System | Landscape architects, designers, engineers, planners, ecologists, architects, developers, policy-makers | Land development, planning, design, and maintenance projects. Projects can be located on sites with or without buildings, ranging from national parks to corporate campuses, **streetscapes,** homes, infrastructure. **Minimum project size: 2,000 square feet.** | If a member, registration is $2,500, certification is $6,500. Additional fees for over 100 acres. | There are 10 points categories: site categories, pre-design addessment and planning, water, soil and vegetation, materials selection, human health and well-being, construction, operations and maitenance, education and performance monitoring, and innovation or exemplary performance. | 4 certification levels based on points earned | Active as of 2008, current version of rating system updated in 2015 | Yes | sites@gbci.org | https://sustainablesites.org/ |

| Tool Name | Company/Org | Description | Type of tool | Used By | Type of projects | Cost to use | Inputs/Requirements | Outputs | Date created/updated | Support provided? | Contact | Website |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Bolded tools are most promising** | | This color indicates that the tool is not in the other tab | Calculators, certifications, standards | Intended and actual users | | Access and certification fees. Does not include other costs associated with required components. | What needs to be accomplished/produced/furnished to complete the process? | End result of the process/program | Recency of creation/update might indicate whether or not the program is active and taken care. | Is support built in or specifically offered? | | |
| GI-Val | The Mersey Forest | This toolkit calculates monetary values for the social, economic and environmental benefits that green infrastructure provides. The Mersey Forest is an English group. Does not address carbon emissions, only benefits of common green infrastructure projects. The health benefits of bike/ped infrastructure is analyzed. | Cost/Benefit | Companies, cities, and agencies. Designed for use in Europe, but it is open source so could be used for ideas and guidance. | Green infrastructure projects such as parks | Free | Data about the physical character of the site and the populations that might benefit. | monetary amounts – applying economic valuation techniques where possible quantitatively – for example with reference to jobs, hectares of land, visitors also references case studies and research when benefits can't be quantified numerically | Still in prototype phase | | | https://www.merseyforest.org.uk/services/gi-val/ |
| eToolLCD | eToolGlobal | This UK, Australia, and Brazil-based company provides software and consulting to companies, developers, and governments, including in the US. During the design phase of infrastructure projects, eToolLCD enables users to measure life cycle environmental impacts for buildings, developments, and infrastructure. The tool is guided by international standards EN 15978 and ISO 14044. After the assessment, they can suggest improvement strategies to decrease impacts. | Life Cycle Assessment (LCA), Certification | Companies, developers, and government agencies of all levels | Small house, mult-residential building, multi-billion dollar development, and infrastructure. They can work with poured concrete and other non-building infrastructure. | There is a free version and several paid subscription options that provide more features. The per project fees only apply to for-profit projects. The per month fees are $50 to $500. | **Requirements for Life Cycle Target Setting Service:** Design brief documents (pre concept design) **Minimum Requirements for basic comparative LCA modelling:** Conceptual design / sketches **Required for EN15978 compliant LCA:** Detailed architectural plans, Construction specification, Structural Drawings, Building energy modelling reports including thermal control, hot water, lighting, vertical transport and other building integrated systems, Equipment specification including details of any onsite generation, energy monitoring etc **Desirable Supplementary or Complementary Information:** Hydraulic, Elec. Struct. Engineers drawings and reports, Intended occupancy data (hours, number etc), 3D BIM Model (ArchiCAD, gbXML, Sketchup, IFC), Actual energy data if retrospective assessment | CO2e, Cost, Energy, Water, Land Use, Ozone Depletion, Human Toxicity, and more. Also generates marketing material. They can directly address maximizing points for other certifications, such as LEED. Improvement strategies. | Current | Yes. They offer tutorials, training, and are available to answer requests for support. There are also forums where knowledge can be shared between other users. | Americas contact: Henrique Mendonca henrique.mendonca@etoolglobal.com +55 13 981484676 General Inquiries: info@etoolglobal.com Online form: https://etoolglobal.com/contact/ | https://etoolglobal.com/about-etoollcd/ |

Methods for Sustainable Transportation Decision-Making
February 2022
Prepared by Nick Shiach

Executive Summary

The City of Bainbridge Island (COBI) and Sustainable Bainbridge are seeking to develop a decision-making framework for evaluating sustainable and non-motorized transportation project proposals. The goal of this framework is to optimize outcomes for greenhouse gas emissions (GHGe) reductions and to quantify these reductions. Scenarios will need to be evaluated against standards and targets and prioritized and/or compared to each other before they are chosen. After implementation, system-wide performance will need to be evaluated for performance (benchmarked).

When it comes to GHGe and vehicle miles traveled (VMT), system and scenario-level analysis is preferable to studying the impacts of specific projects. Quantifying these metrics for individual projects would be costly and could be misleading, since projects are often meant to work together for their full effect.

In 2014, the consulting group Cascadia developed a GHGe inventory for Bainbridge Island. To estimate emissions from the transportation sector, they used a regional model and scaled it down to the municipal level. This was a crude method that is far less accurate than an island-specific sketch model.

| Method | Description |
|---|---|
| Method #1: Transportation Demand Model | Transportation Demand Models (TDMs) use surveys and observed data to estimate real-world transportation conditions and project how future changes to the transit system and the community will change transportation behavior. |
| Method #2: Sketch Models | Sketch models are less expensive and less complex than TDMs, but still can be used to project future GHGe reductions under |

| | different scenarios. |
|---|---|
| Method #3: Cell Phone Data | Using cell phone data to analyze transportation systems is an emerging technology trend. Personal cell phones that are using location-enables apps provide movement data that can be extrapolated into travel data. This data can be used to help create sketch models. |
| Method #4: Community Travel Survey | Community travel surveys can be distributed to citizens to gain insights into transportation behavior and preferences. This is an expensive option that is not ideal for projecting future changes to the transportation system. |
| Method #5: Qualitative Data | Although qualitative measures do not lend themselves to quantifications of GHGe or VMT, they bear mentioning because many environmentally-minded qualitative sustainable transportation measures are used by other agencies. |

We recommend method #2: Sketch Models, method #3: Cell Phone Data, and method #5: Qualitative Data. In particular, under method #2, we recommend hiring a consulting firm to apply a sketch model to the Island. This would enable scenario planning and the comparison of mitigation strategies based on GHGe reduction. For this document, we spoke with Fehr & Peers. For method #3: Cell Phone Data, StreetLightData would be the most comprehensive and accurate option for getting a baseline for VMT on Bainbridge Island.

After detailing these options, along with their major pros and cons, next steps are detailed based on the Climate Change Advisory Committee (CCAC) memo to Bainbridge Island City Council titled *Recommendations in Response to Council Request to Define and Measure Sustainable Transportation Plan Projects.* The research that went into this document informed the content of that memo in part.

To identify these options, I have conducted research on what other local jurisdictions and groups have done to address sustainable transportation planning and GHGe accounting. I interviewed officials with Federal Way, Bellevue, Olympia, the Puget Sound Regional Council (PSRC), the Washington Department of Transportation (WSDOT), the University of Washington,

and the transportation planning consulting group Fehr & Peers. I also reviewed documents from the Federal Highway Administration (FHWA), Environmental Protection Agency (EPA), Redmond, Shoreline, and many other sources.

Vehicle Miles Traveled (VMT)

The Climate Action Plan (CAP) establishes the following VMT-related goals:
- Reduce VMT per capita on the Island by 25% by 2030
- Reduce VMT per capita 50% by 2045

VMT, usually measured per person, is a transportation performance metric that measures the amount of vehicular travel in an area over a specific amount of time. Traffic that is passing through and trips that begin or end outside of the area are included. VMT is used by transportation planners around the country to encourage the development of infrastructure for non-motorized travel.

California recently replaced Level of Service (LOS) with VMT as their primary transportation metric. LOS, the industry standard of traditional transportation metrics, measures vehicular delay and congestion on roadways. This encourages safer and more convenient driving conditions, but does not encourage in-fill development (density) or non-motorized



transportation, often leading to urban sprawl and long distance commutes. The Santa Clara Valley Transportation Authority shared this graphic to illustrate the benefit of using VMT instead of LOS as a transportation metric.

VMT is estimated by the Puget Sound Regional Council (PSRC) using the Activity-Based Travel Model: SoundCast, which is a travel demand model designed for the Puget Sound region (see Method #1 below). There are other ways to evaluate VMT, including more simple models (Method #2), cell phone data (Method #3), and surveys (Method #4). Finally, there are viable alternatives/additions to VMT (Method #5).

The Climate Action Plan focuses on another performance metric, mode share, as an indirect way of accomplishing its VMT reduction goals.

Mode Share

Another transportation performance metric is mode share, which is the proportion of total commute trips by transportation mode. Using modeling or surveys, one could estimate the mode share between sustainable transportation options and personal vehicles. The CAP lists the following goals for mode share, with the intention of reducing VMT:

- By 2030, increase the mode share of active transportation (biking and walking) to 25%, and to 50% by 2045.
- By 2030, increase the mode share of public transit to 5% (currently 2%) and to 10% by 2045.

Mode share can be measured with a model (Methods #1 and #2), cell phone data (Method #3) or travel surveys (Method #4). For benchmarking, data can also be sampled at different locations in-person.

Methods
There are several methods for centering GHGe reduction within the transportation planning process. Below is an outline of the top methods, along with their relative strengths and weaknesses. Multiple methods could be used in tandem with each other.

Method #1: Transportation Demand Model

## Description

Transportation demand models (TDMs) are the gold standard for transportation planning. The PSRC maintains a regional TDM for regional decision-making, which can also be used by municipalities to roughly estimate current and past VMT levels for localities. However, since the model is intended for a wide regional view, zooming in to specific cities introduces a substantial margin of error for past estimates. For projecting future city-wide VMT based on development plans and proposed projects, a sub-area model would need to be developed specifically for Bainbridge Island. This would require hiring a consulting firm and spending significant time and money. A good example of what this might look like is the Santa Clara Countywide VMT Evaluation Tool, which was developed in 2019 by Fehr & Peers.[1] For Bainbridge Island, Fehr & Peers does not recommend a travel demand model.

A model can be used to predict average trip distances and number of bicycle rides. It can also analyze how future changes to land use and the transportation system will impact driving, transit, and non-motorized transportation rates. Models can be used to predict how proposed transportation projects would impact citizen transportation choices. Another way to utilize a model is choosing where to place electric vehicle charging stations and bike-share hubs.

| Pros | Cons |
|------|------|
| • The most accurate way to estimate change in VMT (and other transportation behavior) under different development proposals | • Very high cost - estimated to be six figures<br>• Would take about a year to complete the model<br>• Best suited for other types of transportation planning, such as congestion mitigation, than VMT or GHGe reductions |

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[1] https://vmttool.vta.org/

## Method #2: Sketch Models

### Description

Sketch models are simply transportation demand models that are cheaper and faster to complete, but less precise. The best sketch model available for Bainbridge Island is likely Fehr & Peers' Quick Response Tool. This tool is basically a customized spreadsheet that can conduct a sensitivity analysis that would show how much potential actions would decrease GHG emissions over time. Scenarios can be compared to each other based on GHG emission reductions. This tool can be used to get a better sense of the scale of action and types of projects necessary to achieve the GHG, VMT, and mode share reduction goals the city has established. Implementing this tool for Bainbridge Island would require benchmarks to be set, which would require data collection or purchasing data from a service that aggregates cell phone data. Fehr & Peers recommends StreetLightData, which is discussed under method #3. It would take Fehr & Peers approximately 8-12 months to complete this work as a contractor for Bainbridge Island.

With the Mixed Use Trip Generation Model,[2] the EPA developed a tool that lets local transportation planners predict the VMT impact of mixed-use development. Centrally located and mixed use neighborhoods can help decrease VMT by letting people live near necessities, employment, and entertainment. Despite this, the EPA noticed that traditional transportation performance metrics miss the benefits of this type of development. Trip Generation Analysis should include 'internal capture,' which is when trips take place entirely within a mixed-use development.

The Mixed-Use Trip Generation Model is in use in regions in California, Washington, and New Mexico. The model can be accessed via a spreadsheet with formulas. The model predicts how a new mixed-use development will impact walking trips, transit trips, and VMT. Required data

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[2] https://www.epa.gov/smartgrowth/mixed-use-trip-generation-model

includes geographic, demographic, and land use features of the proposed project. National placeholder data are included, but local trip generation data would make the model more accurate.

Another tool is Remix[3], a computer program that allows local transportation planners to visualize how their transit system could be improved. It can be used to evaluate the impact of transit proposals. Remix can also measure the performance of micromobility programs and help planners make data-driven decisions on new street designs. The company supports clients with data collection as well.

| Pros | Cons |
|---|---|
| <ul><li>Can be used to estimate impacts of different scenarios and plans at the system-level</li><li>Cost and time effective</li><li>Can be more targeted on sustainable transportation projects</li><li>The EPA's tool allows planners to better quantify the positive transportation impacts of mixed-use development</li></ul> | <ul><li>Less accurate than a sub-area TDM</li></ul> |

Method #3: Cell Phone Data

| Description |
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| There are several services that use aggregated and anonymized cell phone location data to create transportation models and estimates. These services offer varying levels of insights, including VMT, mode share, and other transportation behavior.<br><br>Several cities in Washington are starting to look into whether Google Environmental Insights |

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[3] https://www.remix.com/solutions/transit

Explorer (EIE)[4] data could be an actionable surrogate data source for VMT. According to Google, EIE data can be used by cities to estimate the emissions of all trips that begin and/or end within the city using aggregated and anonymized location history data. In addition to large cities such as Seattle, Google has already generated EIE data for Kitsap County, Bremerton, and Jefferson County. EIE is free to use. Rather than just reporting real trips, Google EIE uses user data to create its own transportation demand model. They also offer functionality for GHGe inventories, including both transportation and building emissions.

Unlike PSRC's transportation demand model, Google EIE data cannot be used to create projections on how VMT will change in the future based on land use decisions and project selections. Instead, this data can be used to get a clearer sense of current and recent VMT and transportation activity across different modes. This deeper understanding of current transportation conditions can be used to better inform municipal transportation decisions. Data is available starting in 2018 and is updated with current data periodically.

Another cell phone data source is StreetLight Data.[5] Fehr & Peers uses this company extensively for their transportation work. Each month, StreetLight Data collects and processes 40 billion location records from 110 million phones and navigation devices in the US and Canada and uses it to visualize transportation networks and mode usage. On any given analysis, 1-35% of real trips are captured, depending on the location, time, and duration, and mode. A travel model is created and validated using real-world data. Bainbridge Island would likely need to collect data at strategic points to validate the model. The resulting data visualization and analysis-capability would be far more comprehensive than manual data collection (surveys, sensors) and far cheaper than modeling. The company touts its ability to help transportation planners optimize infrastructure and accurately prioritize spending. StreetLight Data offers the following metrics:

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[4] https://insights.sustainability.google/methodology
[5] https://www.streetlightdata.com/transportation-agency-solutions/

- Annual average daily traffic (AADT, similar to volume)
- Most popular origins, destinations, and routes
- VMT
- Demographics (inferred using census data)
- Trip purpose (inferred using algorithms), differentiating between commute trips, tourism, shopping, etc.

StreetLightData gets its data from in-vehicle navigation-GPS, such as built-in navigation systems in cars and navigational apps. Data is also pulled from apps that have location-based services enabled. These include apps for couponing, dating, weather, tourism, productivity, and apps for locating nearby services.[6]

Moprim[7] takes a unique approach. It is an app that a city or community can sign up for which allows constituents who download it to track their daily movement in a more streamlined and convenient way than a community travel survey's travel log. This app is intended to benefit individual users by allowing them to understand their transportation carbon footprint and take actions to decrease it. Users can compare their footprint and travel habits to other people in the community. The city would get a dataset of travel patterns, along with transportation greenhouse gas emissions over time. Although use is free for the individual user, there is a cost to the community administrator, in this case the city, to make the app available and customized for the Island.

| Pros | Cons |
|---|---|
| - Google EIE is free to use<br>- StreetLightData is $6,000 for the data and another $6,000 to run scenarios | - Google EIE cannot be used for projections<br>- In some cases, data from cell phones |

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https://learn.streetlightdata.com/hubfs/White%20Papers/Methodology%20and%20Data%20Sources/StreetLight%20Data_Methodology%20and%20Data%20Sources.pdf?utm_medium=email&_hsmi=83890399&_hsenc=p2ANqtz--Diz-_0dunyJJ2UjGMzyiiPGuFHt5wu0627idx_o5wWLp6IqepRdioiIREG9g-5LYwVDrS9XVcaiiXuT-mY-AaGxr9bl_KHDhWorU6ivA89kGRZQk&utm_content=83890399&utm_source=hs_automation
7 https://www.moprim.com/movetogether/

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|---|---|
| <ul><li>More comprehensive data coverage than manual data collection</li><li>An emerging method and technology that is gaining traction</li></ul> | <ul><li>should be validated against observed data to ensure accuracy</li><li>Cell phone data sometimes achieves data capture of less than 1%</li></ul> |

Method #4: Community Travel Survey

| Description |
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| A community travel survey could be distributed to households and be used to calibrate models, estimate VMT, estimate mode share, and ask respondents how much they would use potential facilities. Travel surveys usually involve participants keeping a travel log for 2-7 days or longer that includes their origins, destinations, purposes, and demographics. Shuming Yan, a traffic engineer for Bellevue, estimated that these surveys cost $100 to $200 per household. This price is due to the costs of recruiting, data gathering, sample weighting and analysis, and compensating families for participating. |

| Pros | Cons |
|---|---|
| <ul><li>Likely more affordable than a sub-area transportation model</li><li>Higher quality data points with less ambiguity than cell phone data or sensors</li></ul> | <ul><li>Some community travel surveys can be expensive to conduct</li><li>Much smaller sample size than cell phone data or sensors</li></ul> |

Method #5: Qualitative Approach

| Description |
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| When evaluating transportation projects both in the planning stage and the benchmarking stage, it will be important to consider performance metrics beyond VMT. For example, Access to Community Destinations is a good example of a metric that is not VMT, cannot be used to predict or measure VMT, but that nonetheless naturally favors projects that would in reality reduce GHGe. Using this metric, simply favor projects that connect the most people (residences) to the most oft-visited destinations (ferry terminal, schools, stores, parks). |

Common alternative transportation metrics are listed and explained below this table.

The Federal Highway Administration (FHWA) published the *Guidebook for Developing Pedestrian and Bicycle Performance Measures* (2016)[8]. The document lists 30 performance measures in their 'toolbox' and 8 are environment-related. Two of those metrics are VMT and mode share, and the rest are listed in or below this table.

Most of these metrics are quantifiable and can provide numerical and objective results. These Methods are labeled "qualitative" in this document because they do not quantify GHGe reductions.

| Pros | Cons |
|---|---|
| <ul><li>Taken together, these additional metrics provide a well-rounded toolbox of evaluation tools that take many different factors into account</li><li>Equity can be considered</li><li>Usually relatively cheap to use</li><li>Often easier to communicate to the public than VMT, mode share, or modeling</li><li>In-line with best practices as outlined by the FHWA and other municipalities in Washington State.</li></ul> | <ul><li>Does not predict or quantify reductions in VMT or GHGe</li></ul> |

Measures from the FHWA's *Guidebook for Developing Pedestrian and Bicycle Performance Measures* (2016)

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[8]

https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/performance_measures_guidebook/pm_guidebook.pdf

1. The Land Consumption performance metric measures the amount of land dedicated to development of various uses, including buildings and transportation infrastructure. Where traditional performance metrics reward projects that contribute to sprawling growth, Land Consumption considers natural resource use and environmental impact. The metric relates to zoning laws as well. More dense zoning not only uses less land, it also reduces VMT.

2. Network Completion is the portion of the transportation network that is usable for people walking or bicycling, and represents the minimum accommodations needed for a facility to be considered part of the walking or bicycling network. To use this metric, the city would need to define what a complete segment entails. According to Shuming Yan, a traffic engineer with Bellevue, bike path and transit network completion is a good transportation metric and policy goal.

3. Route directness (pedestrian connectivity) is a measure of the most direct routes for walking and biking between two designated locations. Ideally, walking and biking routes should be as short and direct as possible without sacrificing user comfort. Maps of travel networks by mode would be needed along with the location of origins and destinations. Similar to the access to community destinations metric, decisions need to be made as to which locations are included in the analysis (often schools, stores, places of work, homes, etc.). After choosing two points, measure how long the shortest pedestrian or bicyclist route between them is. Divide this number by the straight-line distance between the two points. 1.0 is the minimum possible rating and a perfect score. Lower numbers represent more direct routes.

4. Volume is the measured (i.e., counted) number of pedestrians and bicyclists in a specified area for a designated period of time. Where VMT measures across an entire area, usually a city or county, volume measures at specific places along roads or paths. Measuring volume could be useful for determining need but has the most potential as a benchmarking tool. When determining demand, it is important to keep in mind that future use will be demographically different than current use. Volume measurement could also be used on existing pedestrian infrastructure to get a sense of how much use

a proposed segment would garner, keeping in mind that as the network becomes more complete and equitable, usage should improve across the system.

5. Street trees is the number of trees on a street or other area. Planting trees can be a straightforward and quantifiable way to quickly offset carbon emissions from a transportation infrastructure project and might help with public support, especially when the project necessitates cutting down existing trees. A GIS-based tree inventory, aerial imagery and/or on-site tree inventory would be needed. The metric is typically measured as the number of trees, percent of street tree canopy coverage, number of trees per mile, and/or tree spacing.

6. VMT, mode share, and access to community destinations

Metrics from other sources

Population Density in proximity to the proposed project is a good way to ensure new facilities are needed and will be well-utilized by the community. Dr. Anne Vernez Moudon from the University of Washington Department of Urban Design and Planning has conducted research that supports using existing residential population density to prioritize bicycle and pedestrian projects.

Projects can also be prioritized based on pedestrian and bike safety improvements. Using crash and incident data, areas that most need pedestrian or bicycle safety improvements can be prioritized. Surveys can also be used to gauge perceptions of safety and comfort for different areas. Making the transportation network safer for walkers and riders, both in reality and in perceptions, encourages non-motorized travel.

Studying regional transportation behavior with The National Household Travel Survey could be helpful for understanding the variables that are correlated with travel metrics such as VMT and mode share.[9]

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[9] https://nhts.ornl.gov/

The EPA's Smart Location Database[10] allows users to compare census tracts across 90 different variables to help prioritize project areas. The Smart Location Calculator[11] takes an actual or potential workplace location and provides a way to estimate average employee commute VMT and associated transportation impacts. It provides an easy way to compare the relative location efficiency of work sites across a given metro region and inform the process of facility site selection for workplaces.

Walk Score[12] is an apartment finder website that also studies how well pedestrians, bicyclists, and transit users can get around cities and neighborhoods without a car. Walk Score has ranked Bainbridge Island and 14 of its neighborhoods based on a walk score, bike score, and transit score. Scores are on a scale from 0 to 100. Transportation planners have used these scores in their research. Walk Score's methodology can be found here.[13] For each address in the city/neighborhood, Walk Score measures the walking distance to amenities, along with pedestrian friendliness. The bike score measures bike infrastructure, hills, destinations, connectivity, and number of bike commuters. Areas with lower scores could be prioritized over similar areas with higher scores.

The EPA's National Walkability Index (2021) shows what parts of the city are more walkable than others. The methodology can be found here.[14] Orange is low walkability and green is high. If this data is compared to current and future population density, this map could provide a crude guide to help with prioritization of transportation projects based on location.
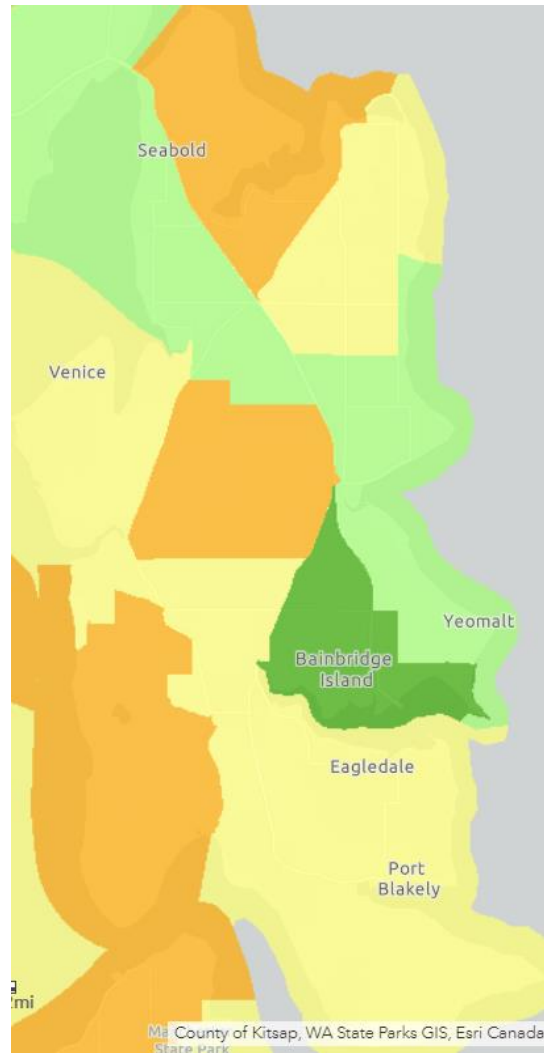
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[10] https://www.epa.gov/smartgrowth/smart-location-mapping#SLD
[11] https://www.slc.gsa.gov/slc/#
[12] https://www.walkscore.com/WA/Bainbridge_Island
[13] https://www.walkscore.com/methodology.shtml
[14] https://www.epa.gov/smartgrowth/national-walkability-index-user-guide-and-methodology

Next Steps & Takeaways

1. Complete a report on different possible performance metrics that could be considered by COBI for measuring GHG emission reductions from transportation projects.

2. Hire a consulting firm to develop a baseline understanding of our Island's VMT and develop a tool to allow us to evaluate what actions will provide the greatest reductions in GHG emissions associated with VMT reductions over time.

3. Focus on estimating the reductions in GHG emissions at the systems level instead of individual projects.

4. Do not focus on quantifying the embedded emissions of sustainable transportation projects. Emissions from sustainable transportation infrastructure should be compared to alternative conventional projects, which would encourage personal vehicle use rather than discourage it. Instead of quantifying their emissions, sustainable transportation infrastructure should be optimized for sustainability using a calculator or certification program.